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A quasistatic bilateral contact problem with adhesion and friction for viscoelastic materials

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Abstract: We consider a mathematical model which describes a contact problem between a deformable body and a foundation. The contact is bilateral and is modelled with Tresca's friction law in which adhesion is taken into account. The evolution of the bonding field is described by a first order differential equation and the material's behavior is modelled with a nonlinear viscoelastic constitutive law. We derive a variational formulation of the mechanical problem and prove the existence and uniqueness result of the weak solution. The proof is based on arguments of time-dependent variational inequalities, differential equations and Banach fixed point theorem.

Keywords: viscoelastic materials, adhesion, Tresca's friction, fixed point, weak solution
AMS Subject Classification: 47J20, 49J40, 74M10, 74M15

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